



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,906	01/11/2006	Sergei Konstantinovich Gordeev	1501-1304	6563
466 7590 03/22/2007 YOUNG & THOMPSON 745 SOUTH 23RD STREET 2ND FLOOR ARLINGTON, VA 22202			EXAMINER KERN, KEVIN P	
			ART UNIT	PAPER NUMBER
			1725	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/22/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/536,906

Applicant(s)

GORDEEV ET AL.

Examiner

Kevin P. Kerns

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2005 and 11 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☒ Claim(s) 1,4-7 and 10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152..

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/27/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Specification*

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

In this instance, the abstract is not on a separate page (currently written only on the front page of the corresponding WIPO document), and includes two instances of the phrase that can be implied "The present invention...". Also, the term "ban" should be replaced with "can" after "which" in the 2<sup>nd</sup> line from the end of the abstract.

2. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.

(f) BACKGROUND OF THE INVENTION.

(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(g) BRIEF SUMMARY OF THE INVENTION.

(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(i) DETAILED DESCRIPTION OF THE INVENTION.

(j) CLAIM OR CLAIMS (commencing on a separate sheet).

(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

In this instance, the specification lacks section headings.

3. The disclosure is objected to because of the following informalities: on page 1, 10<sup>th</sup> and 25<sup>th</sup> lines, reference numbers [1] and [2] are intended to be prior art references, both of which should be listed by prior art citation(s), such as patent numbers etc. On page 2, 4<sup>th</sup> line, insert "," before "at least" for clarity. On page 2, 8<sup>th</sup> and 9<sup>th</sup> lines, replace "treatment natural gas at temperature" with "treatment, natural gas at temperatures of". On page 2, 14<sup>th</sup> line, insert "and" before "damping". On page 2, 19<sup>th</sup> line, replace "teir" with "their". On page 3, 3<sup>rd</sup> line, insert "an" before "intermediate". On page 3, 5<sup>th</sup> line, insert "," after "work-piece" for clarity. On page 3, 27<sup>th</sup> line, insert "a" before "surface". On page 4, 14<sup>th</sup> line, insert "an" before "initial". On page 5, 15<sup>th</sup> line, delete "-" before "body". On page 6, 1<sup>st</sup> line, replace "surface" with either "a surface" or "surfaces". Corrections and/or clarifications are required for these and other errors that occur throughout the specification.

***Claim Objections***

4. Claims 1, 4-7, and 10 are objected to because of the following informalities: in claim 1, 5<sup>th</sup> line, insert "a" before "temperature". In claim 4, 2<sup>nd</sup> line, insert "," after "work-piece" for clarity. In claim 4, 3<sup>rd</sup> line, it is believed that "used" should be deleted. In claim 5, 3<sup>rd</sup> line, replace "carbide forming" with "carbide-forming". In claim 5, last line, replace "temperature" with "temperatures of". In claims 6 and 7, 2<sup>nd</sup> line of both claims, replace "workpiece" with "work-piece" for consistency. In claim 6, last line, insert "of" after "porosity". In claim 10, 2<sup>nd</sup> line, insert "," after "treatment" for clarity. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the metallic phase". There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1725

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-4, 7, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burke (US 5,000,249) in view of Claar et al. (US 5,149,678).

Burke discloses a method of forming metal matrix composites by immersion casting, in which the method includes the steps of preparing an intermediate body (porous carbide workpiece, or preform 1, made from pressing and sintering carbide powders) by placing porous carbide preform 1 into a copper mold 3 having a copper foil 9 at its open end; immersing/dipping the preform 1, copper mold 3, and copper foil 9 into a molten aluminum alloy matrix metal pool 5 at a selected depth and pressure (partial or total immersion and/or more pressure on the bottom of the preform versus the top of the preform due to higher pressures at greater immersion depths, resulting selectively in non-uniform and uniform distribution, respectively, of metal melt in the

Art Unit: 1725

porous carbide preform 1); applying additional heat to result in melting and dispersing the copper mold 3 and foil 9 to be infiltrated (along with the molten aluminum alloy matrix metal as the other metal) into the porous carbide preform 1 after about one hour at a temperature exceeding the melting point of the metallic phase of the intermediate body, or preform 1, thus producing a refractory composite material (abstract; column 7, lines 6-68; column 8, lines 1-45; column 11, lines 10-15 and 31-37; column 14, lines 46-65; column 16, lines 21-29; column 17, lines 9-29; column 18, lines 57-68; column 19, lines 1-2; column 20, lines 66-68; column 21, lines 1-5; Example 1; and Figures 1-6). Although Burke discloses that two metals (copper and aluminum alloy) are infiltrated into the porous carbide preform, Burke does not specifically disclose that these two metals are consecutively infiltrated, rather than simultaneously infiltrated.

However, Claar et al. disclose a method of modifying ceramic composite bodies by a post-treatment process, in which the method includes the steps of providing an intermediate body, or previously untreated composite body 3 (Figure 1) of ceramic and zirconium metal ( $\text{ZrB}_2\text{-ZrC-Zr}$ ), introducing the composite body 3 into a vessel 1 containing siliconizing or aluminizing powder 2, and heating the powder 2 until a portion of the powder 2 (at or above its melting point) infiltrates the surface of the composite body 3, such that the use of a second metal to infiltrate the ceramic/zirconium metal composite is advantageous for modifying the surface properties of the composite, thus providing increased oxidation resistance (abstract; column 1, lines 19-29; column 5, lines 51-68; column 6, lines 1-59; column 7, lines 6-16 and 46-68; column 8, lines 1-56; Examples 1-6; and Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the method of forming metal matrix composites by immersion casting, as disclosed by Burke, by using the method of modifying ceramic composite bodies by a post-treatment process to introduce a second metal to be infiltrated to the intermediate body (previously untreated composite body), as taught by Claar et al., in order to modify the surface properties of the composite, thus providing increased oxidation resistance (Claar et al.; abstract; column 6, lines 46-52; and Examples 2-5).

10. Claims 5, 6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burke (US 5,000,249) in view of Claar et al. (US 5,149,678), as applied to claim 1 above, and further in view of Avarbz et al. (US 5,876,787).

Burke (in view of Claar et al.) disclose and/or suggest the features of independent claim 1. Neither Burke nor Claar et al. specifically discloses the treatment at decomposition temperatures in the presence of hydrocarbons, a porosity of 30-60% by volume of the porous carbide workpiece, and non-uniform porosity of the workpiece.

However, Avarbz et al. disclose a process of manufacturing a porous carbon material, in which the process includes the steps of providing a porous metal carbide material having a porosity of 30-50% by volume, which was generally non-uniform in nature (column 2, lines 34-51; and column 8, lines 20-31) and is able to be controlled (column 4, lines 46-52), treating the porous carbide material in an atmosphere of a gaseous hydrocarbon mixture (column 4, lines 54-67; and column 5, lines 1-18) to

increase the mass of the porous carbide material prior to heating to 1450-1700 degrees Celsius; such that these additional features are advantageous for obtaining a porous carbon material that contains transport channels having micro-porosity and nanosized pores, thus increasing mechanical stability (abstract; column 2, lines 14-67; column 3, lines 1-35 and 66-67; column 4, lines 1-67; column 5, lines 1-18; column 6, lines 7-28; column 8, lines 20-31; and Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the method of forming metal matrix composites by immersion casting, as disclosed by Burke, by using the method of modifying ceramic composite bodies by a post-treatment process to introduce a second metal to be infiltrated to the intermediate body (previously untreated composite body), as taught by Claar et al., in order to modify the surface properties of the composite, thus providing increased oxidation resistance, and by further providing treatment at decomposition temperatures in the presence of hydrocarbons and a non-uniform porosity of 30-60% by volume of the porous carbide, as disclosed by Avarbz et al., in order to obtain a porous carbon material that contains transport channels having micro-porosity and nanosized pores, thus increasing mechanical stability (Avarbz et al.; abstract; and column 2, lines 19-28).

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6,841,119 is also cited in PTO-892.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin P. Kerns *Kevin Kerns 3/19/07*  
Primary Examiner  
Art Unit 1725

*KPK*  
kpk  
March 19, 2007